APPENDIX B
U.S. GEOLOGICAL SURVEY WORKPLAN FOR HERRINGTON LAKE TMDL PROJECT

WORK PLAN

TMDL Study of Phosphorus Concentrations
in
Herrington Lake, Kentucky

Statement of Problem

The upper reaches of this central-Kentucky lake are fed primarily by the Dix River and Clarks Run. Recent sampling results indicate that the upper portion of the lake is hypereutrophic, while other areas of the lake are eutrophic. Documented results of this problem include fish kills and average dissolved oxygen (DO) concentrations of less than 5 mg/l in the lake's epilimnion. The Kentucky Division of Water (DOW) determined in its 1992 Section 305(b) report that because of these water quality problems Herrington Lake does not support its designated aquatic life use (*Kentucky Report to Congress on Water Quality*, 1992); and the 1992 Section 303(d) report identified the lake as a high priority water body requiring a Total Maximum Daily Load (TMDL) study.

The primary external nutrient causing eutrophication in Herrington Lake is phosphorus from municipal point source discharges, agricultural non-point sources, and septic tanks. The primacy of one of these sources over the other two has not been established, and this lack of information limits the effectiveness of lake and lake basin management decisions regarding effective ways to reduce lake loading. Internal nutrient sources may further confound management decisions, as the internal cycling of nutrients residing in the lake sediments can potentially sustain eutrophic conditions even with significant load reductions from external nutrient sources.

Objective

The proposed study will determine existing phosphorus loadings, identify the principal sources of this pollutant, and estimate the reductions needed to lower the trophic status of the lake. Based on this information, the DOW will then develop control strategies to bring about the needed reductions.

The data collection and analysis proposed for this project are designed to determine the ***nutrient assimilation capacity*** of Herrington Lake, and from that information to estimate an acceptable nutrient loading rate to the lake. The nutrient assimilation capacity of the lake is the lake's capacity to absorb external nutrient inputs and still maintain an acceptable level of quality. "Acceptable level" may be defined, for example, as a prespecified level of the Carlson Trophic Status Index for Chl α, total phosphorus, or Secchi depth. Mathematically it can be shown that the assimilation capacity of the lake can be related to external loading through calculation of an assimilation factor (see Attachment A). Estimation of the assimilation factor will allow the determination of an acceptable external loading rate of nutrients to the lake, "acceptable" being defined as a level that would eventually result in an acceptable level of inlake water quality. Once an acceptable external loading rate is established, sources can be identified and efforts made to reach the loading target.

It is important that a reliable understanding be developed of the relation of external nutrient loading to internal nutrient concentrations and between internal nutrient concentrations and the problems of concern, e.g., algal proliferation. In Herrington Lake, these problems have been identified as fish kills caused by poor water quality and dissolved oxygen concentrations averaging less than 5 mg/l in the epilimnion. It is likely that both of these problems have the same source: nutrient-limited (or insufficiently limited) algal growth.

Consequently, it is important to understand the factors that control algal growth in the system and especially the nutrient algal interaction, for if algal growth is a major cause of the identified problems in Herrington Lake and algal growth in Herrington Lake is nutrient-limited, then nutrient management in Herrington Lake is the key to problem management.

Approach

Lacking sufficient in-house expertise to carry out the mathematical modeling necessary to complete this project, the DOW will contract the data collection and analysis components to qualified staff in the U.S. Geological Survey (USGS).

The hypothesis for this project is presented in two statements:

(1) nutrient-limited algal growth is primarily responsible for the fish kill problems and the low epilimnetic DO concentrations in the lake, and

(2) the nutrient-algal relation can be adequately described with mathematical formulae.

Details of this hypothesis will be formulated as a conceptual model (see Attachment B) which describes the general relations between nutrients and algae in the lake and its inflows. This modeling effort will require extensive water quality data collection and a thorough statistical analysis of the data. Empirically based models will be developed using the Bathtub and the Eutromod approaches, both of which are recognized and supported by the North American Lake Management Society.

As a supplement to the scope of work proposed for this grant project, the USGS will also calibrate and validate a pair of physically based models: the CE-QUAL W2, supported by the U.S. Army Corps of Engineers, and the WASP, supported by the U.S. EPA, as a means of testing the above hypothesis. To accomplish this project, an intensive data collection program will be linked with the CE-QUAL W2 reservoir model of Herrington Lake and its watershed. This effort will provide an assessment of the nutrient and trophic state dynamics in the lake and link them with land use activities. The program design will result in the calibration of a physically based model capable of simulating pool water volume, surface elevation, water density, vertical and longitudinal velocities, temperature gradients and heat distribution, dissolved oxygen, nutrients, and chlorophyll α concentrations, distributions, and interactions, and predict water quality releases from the reservoir. For this supplemental modeling work, the USGS will commit an additional $130,000 of their own funding.

Input requirements for the modeling include reservoir bathymetry and hydrology, meteorological data, constituent fluxes into and out of the reservoir, and biological and chemical reaction rates. Calibration of the model will require daily average inflows and outflows (for flux estimation) and vertical and longitudinal inlake concentration of constituents (with estimates of variability). Calibration of the physical model will also be accomplished by comparison with sophisticated empirical models developed for the lake, lake quality indices, and phytoplankton community analyses. If agreement between all of these methods can be accomplished for the same data, the models will be considered rigorously tested and useful for making management decisions which may be subject to legal scrutiny and/or litigation.

Data Collection

The data collection program will be conducted over a two-year time frame with 16 sampling dates each year. Sampling for nutrients including Soluble Reactive Phosphorus (SRP), Non-Soluble Reactive Phosphorus (NSRP), Nitrate Nitrogen, Ammonia Nitrogen, and Total Kjeldahl Nitrogen will be conducted on a bi-weekly basis, beginning the last week of February and ending the first week of November, for five locations within the lake and five inflow stations. Each lake station will be sampled at four depths based on thermal stratification if it exists and at two depths if the lake is not stratified.

The algal community will be characterized by a single integrated sample from the upper three meters of the water column in the lake on each sample date. Algal information will be analyzed as Phytoplankton Biovolume, Community Structure, and Chlorophyll α.

Also collected at each site for each sample run will be Dissolved Oxygen, Specific Conductance, Water Temperature, and pH. In the lake sites these four variables will be sampled at vertical intervals adequate to properly characterize the temperature and DO profiles at each site. Secchi depth and fecal coliform data will be collected at each lake site for each run. At each of the inflows, instantaneous discharge will be estimated on each run.

Sample quantity calculations:

Nutrient sample numbers for inflows:
5 sites x 16 dates x 2 years = **160 samples**

Nutrient sample numbers for the lake (not stratified @ 5 dates):
5 sites x 5 dates x 2 depths x 2 years = **100 samples**

Nutrient sample numbers for the lake (stratified @ 11 dates):
5 sites x 11 dates x 4 depths x 2 years = **440 samples**

Total nutrient samples = 700

Total algal sample numbers = 5 sites x 16 dates x 2 years = 160 samples

Project oversight

As the official grant recipient for this project, the DOW will provide staff oversight and management assistance to the contractor to fulfill the obligations of this work plan. DOW personnel will also involve other state and federal agencies early in the planning phases to ensure various interests and concerns are addressed in the project design and implementation. These entities will include the Kentucky Department of Fish and Wildlife Resources, the Kentucky Division of Conservation, the U.S. Soil Conservation Service, and local concerned citizen groups. The DOW will organize various meetings for all interested parties on a quarterly basis, both to inform them of the project and to solicit their input.

Other state and federal agencies will be involved early in the planning phases to ensure various interests and concerns are addressed in the project design. These entities will include the Kentucky Department of Fish and Wildlife Resources, the Kentucky Division of Conservation, the U.S. Soil Conservation Service, and local concerned citizen groups.

Final Products

A final report will describe the existing problems in Herrington Lake and provide a detailed analysis of the sources of these problems. The report will be used in making permit decisions for point source discharges, and will serve as a reference for all agencies and citizen groups involved with reducing nonpoint contributions.

DOW will review this report and work to implement the recommendations through the various programs of the division, e.g., nonpoint source and point source pollution control.

During the course of this project, quarterly progress reports will be submitted to update the EPA on the status of grant efforts.

The DOW will also monitor Herrington Lake for a number of years following the project to determine the effectiveness of the control measures once implemented, and will institute further controls if necessary. In addition, the DOW will be able to transfer the modeling methods learned in implementing the Herrington Lake project to other watersheds around the Commonwealth.

Milestones

Begin literature review	July 1994
Begin meeting quarterly with other state and federal agencies and interested parties	July 1994
Begin stream data collection	October 1994
Begin data analysis	February 1995
Begin model development	February 1995
Begin preparing report	January 1996
Begin model calibration (USGS contribution)	March 1996
Begin model validation (USGS contribution)	May 1996
Complete stream data collection	September 1996
Complete model calibration (USGS contribution)	February 1997
Complete model validation (USGS contribution)	June 1997
Complete study report	September 1997

Budget

The budget for this project is presented below.

Salary and Fringe (.15 Person Year, Grade 15 at $42,480)	$6,408
Indirect (35.92%)	$3,592
Contractual (USGS)	$235,000
TOTAL	$245,000

The USGS, as the contractor for the data collection and analysis component of this project, will also calibrate and validate two physically based models as detailed in the "Approach" section of this work plan, for a total cost of $130,000 of their own funding.

ATTACHMENT A

Equation 1

$$\phi = \frac{\textit{external loading}}{\textit{acceptable level of water quality}}$$

where ϕ = assimilation factor $[MT^{-1}\ (ML^{-3})^{-1}]$ which is the net effect of all processes (transport or kinetic) which remove the nutrient of interest from the lake system.

Calculation of ϕ in a generalized model can be accomplished using the following equation:

Equation 2

$$\phi = W_o + \left[\left(\frac{v_1}{z}F_1 + \frac{v_4}{z}F_4\right)v_{t,w}\right] - R_1$$

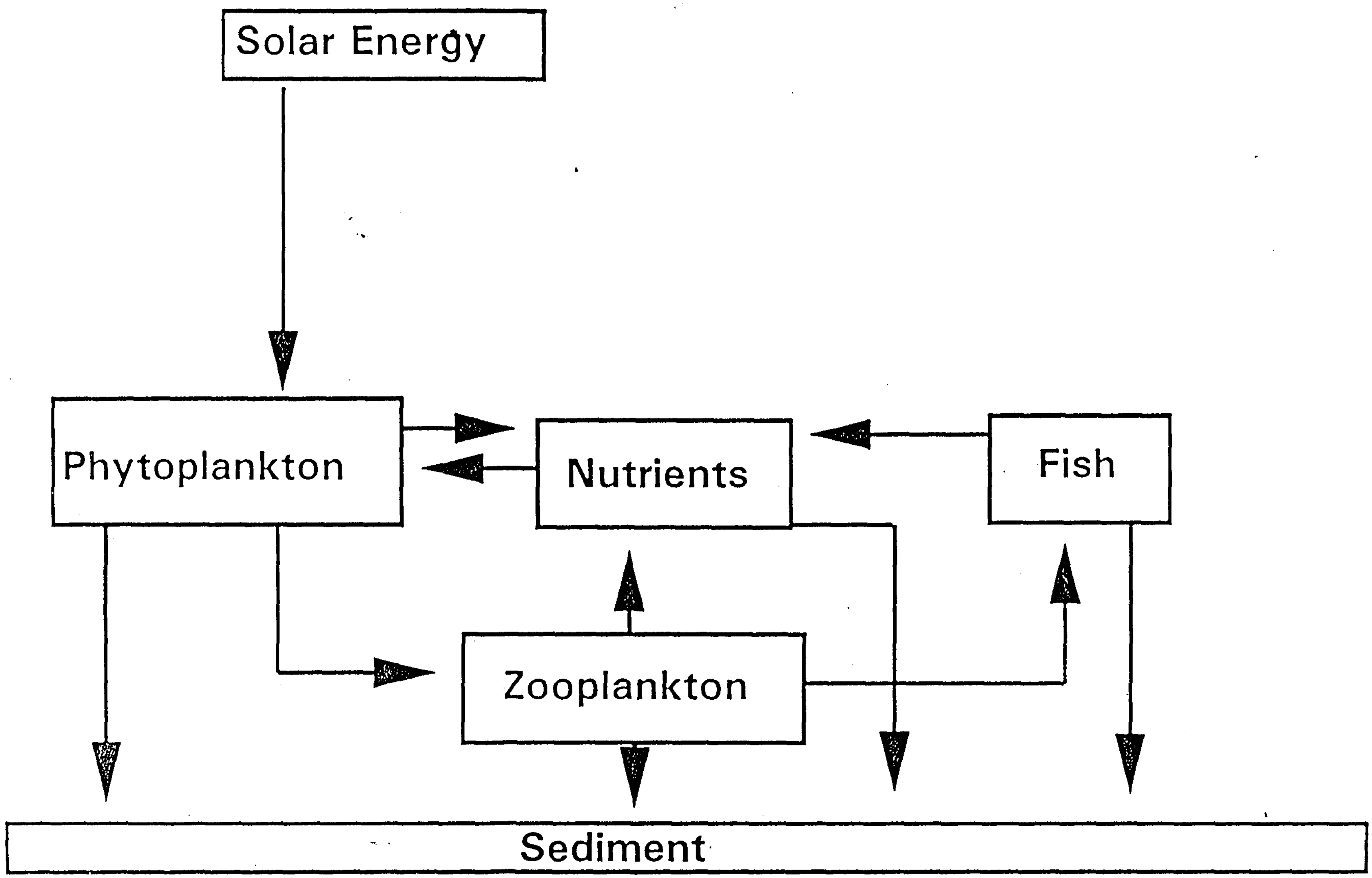
where

W_0 = flux of nutrient out of system
v_1, v_4 = settling velocities of phytoplankton and detritus / mineral matter, respectively
F_1, F_4 = fractions of the total nutrient in phytoplankton and detrital / mineral matter forms, respectively
R_1 = recycling of nutrient within water column or from sediment

The acceptable external loading rate of nutrients to the lake is shown by the rearrangement of Equation 1.

$$\textit{external loading} = \phi(\textit{acceptable level of water quality})$$

Mass and Energy Flow Model for Reservoir Plankton



ATTACHMENT B

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
OFFICE OF THE SECRETARY
FRANKFORT KENTUCKY 40601
TELEPHONE: (502) 564-3350

August 22, 1994

Mr. Hector Buitrago
Grants Specialist
Grants and IAG Operations Unit
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Buitrago:

Enclosed is an original signed Grant Agreement #CP994584-94 for the Section 104(b)(3) NPDES Program Implementation grant to conduct a TMDL study of Phosphorus Concentration in Herrington Lake in Kentucky. On behalf of the Commonwealth of Kentucky, I am pleased to accept this award for $245,000.

I appreciate the Environmental Protection Agency's support of Kentucky's efforts to protect and study the water quality of the Commonwealth. If you have any questions or concerns, please contact Tonya Sangester at (502) 564-3410.

Sincerely,

Phillip J. Shepherd

PJS/trs

Enclosure

cc: Grace Deatrick
David Leist

APPENDIX C
LIST OF STREAMS (OTHER THAN OHIO RIVER) NOT SUPPORTING USES BY RIVER BASIN

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
		Uses Not Supported					
Big Sandy River Basin							
Tug Fork	(KY5070201-001) (KY5070201-004)	10.3(E)*	Siltation	Mining/ Silviculture	57.9(M,**E)	Pathogens	Package Plants/ Septic Tanks/ Agriculture
Road Fork	(KY5070201-002)	2.1(E)	Siltation	Mining			
Straight Fork Road	(KY5070201-002)	1.6(E)	Siltation	Mining			
Coldwater Fork	(KY5070201-002)	8.5(E)	Siltation/pH/ Metals/Suspended Solids/Chlorides	Mining/ Petroleum Activities	8.5(E)	pH	Mining
Wolf Creek	(KY5070201-003)	20.5(E)	Siltation/pH/ Metals/Turbidity	Mining	20.5(E)	pH	Mining
Meathouse Creek	(KY5070201-003)	4.3(E)	Siltation/pH/ Metals/Turbidity	Mining	4.3(E)	pH	Mining
Pigeon Roost Fork & Davis Fork	(KY5070201-003)	9.8(E)	Siltation/pH/ Metals/Turbidity	Mining	9.8(E)	pH	Mining
White Oak Fork	(KY5070201-003)	6.0(E)	Siltation/pH/ Metals/Turbidity	Mining	6.0(E)	pH	Mining
Peter Cave Fork	(KY5070201-003)	6.6(E)	Siltation/pH/ Metals/Turbidity	Mining	6.6(E)	pH	Mining
Emily Creek	(KY5070201-003)	7.0(E)	Siltation/pH Metals/Turbidity	Mining	7.0(E)	pH	Mining

List of Streams Not Supporting Uses by River Basin (Continued)

		Uses Not Supported					
Stream (Waterbody I.D.)		Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Big Sandy River Basin (Continued)							
Big Creek	(KY5070201-005)	19.7(E)	Siltation	Agriculture/ Mining			
Knox Creek	(KY5070201-010)				7.6(E)	Pathogens	Agriculture/Septic Tanks
Levisa Fork	(KY5070202-001) (KY5070203-001) (KY5070203-010) (KY5070203-016) (KY5070203-021)	33.5(E)	Siltation/ Turbidity	Mining	65.1(M)	Pathogens	Package Plants/ Septic Tanks Agriculture
Bull Creek	(KY5070203-017)	7.2(E)	Siltation/Habitat Alterations	Mining/ Streambank Modification			
Shelby Creek	(KY5070202-002)				10.0(E)	Pathogens	Package Plants
Greasy Creek	(KY5070202-003)	7.2(E)	Siltation	Mining			
Russell Fork	(KY5070202-004)				16.0(E)	Pathogens	Municipal/Package Plants/Septic Tanks/ Agriculture
Elkhorn Creek	(KY5070202-005)				27.4(E)	Pathogens	Package Plants
Paint Creek	(KY5070203-005)				1.0(E)	Pathogens	Urban Runoff/ Storm Sewers
Jennys Creek	(KY5070203-006)	11.0(E)	Siltation	Road Construction			

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported: Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Big Sandy River Basin (Continued)							
Lick Fork	(KY5070203-006)	7.8(E)	Siltation	Road Construction			
Mudlick Creek	(KY5070203-007)	11.0(E)	Siltation	Mining			
Brushy Fork	(KY5070203-013)	18.5(E)	Siltation/ Turbidity	Mining			
Buffalo Creek	(KY5070203-013)	10.9(E)	Siltation/ Turbidity	Mining			
John Creek	(KY5070203-013)	44.7(E)	Siltation/ Turbidity	Mining			
Left Fork Brushy	(KY5070203-013)	8.0(E)	Siltation/ Turbidity	Mining			
Raccoon Creek	(KY5070203-013)	11.0(E)	Siltation/ Turbidity	Mining			
Middle Creek	(KY5070203-014)	18.0(E)	Siltation/pH	Mining	18.0(E)	pH	Mining
Left Fork Middle Creek	(KY5070203-014)	9.5(E)	Siltation/pH	Mining	9.5(E)	pH	Mining
Beaver Creek	(KY5070203-018)	7.0(E)	Siltation	Mining/ Streambank Modification	7.0(E)	Pathogens	Package Plants/ Municipal
Left Fork Beaver Creek	(KY5070203-020)	28.0(E)	Siltation	Mining			

List of Streams Not Supporting Uses by River Basin (Continued)

Stream	(Waterbody I.D.)	Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
		Uses Not Supported					
Big Sandy River Basin (Continued)							
Big Sandy	(KY5070204-001)				26.8(M)	Pathogens	Municipal/Package Plants/Septic Tanks/Agriculture
Little Sandy River Basin							
East Fork Little Sandy River	(KY5090104-003)	6.0(M)	Organic Enrichment	Package Plants			
Shope Creek	(KY5090104-003)	5.4(M)	Organic Enrichment	Package Plants			
Newcombe Creek	(KY5090104-009)	11.9(M)	Chlorides	Petroleum Activities			
Licking River Basin							
Licking River	(KY5100101-001) (KY5100101-004) (KY5100101-015) (KY5100101-034)	6.3(M)	Metals	Unknown	98.1(M)	Pathogens	Municipal/Package Plants/Septic Tanks/Agriculture/ Combined Sewer Overflows
	(KY5100101-039)	33.4(E)	Siltation	Mining			
North Fork Licking River	(KY5100101-012)				51.3(M)	Pathogens	Agriculture
Banklick Creek	(KY5100101-002)				19.0(M)	Pathogens	Combined Sewer Overflows

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported: Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Licking River Basin (Continued)							
Three-Mile Creek	(KY5100101-003)				4.7(M)	Pathogens	Urban Runoff/ Storm Sewers
Fleming Creek	(KY5100101-018)				16.5(M)	Pathogens	Agriculture/ Pasture Land/ Feedlots
Sleepy Run	(KY5100101-018)				3.0(M)	Pathogens	Pasture Land/Feedlots
Wilson Run	(KY5100101-018)				5.1(M)	Pathogens	Pasture Land/Feedlots
Town Branch	(KY5100101-018)				4.0(M)	Pathogens	Pasture Land/Feedlots
Allison Creek	(KY5100101-018)	4.7(M)	Organic enrichment	Nutrients/Organic Enrichment/Noxious Aquatic Plants	4.7(M)	Pathogens	Pasture Land/Feedlots
Doty Creek	(KY5100101-018)	4.0(M)	Organic enrichment	Pasture Land/ Feedlots	4.0(M)	Pathogens	Pasture Land/Feedlots
Lick Creek	(KY5100101-037)	9.2(E)	Chlorides	Petroleum Activities			
Raccoon Creek	(KY5100101-037)	5.2(E)	Chlorides	Petroleum Activities			
Burning Fork	(KY5100101-038)	7.5(E)	Chlorides	Petroleum Activities			

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Licking River Basin (Continued)							
State Road Fork	(KY5100101-038)	5.1(E)	Chlorides	Petroleum Activities			
Rockhouse Fork	(KY5100101-038)	5.0(E)	Chlorides	Petroleum Activities			
Puncheon Camp Cr	(KY5100101-039)	4.7(E)	Siltation	Mining			
Trace Fork	(KY5100101-039)	8.4(E)	Siltation	Mining			
South Fk. Licking River	(KY5100102-001)				15.6(M)	Pathogens	Agriculture
Indian Creek	(KY5100102-009)				0.6(E)	Pathogens	Municipal
Stoner Creek	(KY5100102-012)				9.6(E)	Pathogens	Agriculture/Urban Runoff
Houston Creek	(KY5100102-013)				14.0(E)	Pathogens	Agriculture
Hancock Creek	(KY5100102-017)				7.6(E)	Pathogens	Package Plants/ Urban Runoff/Storm Sewers
Strodes Creek	(KY5100102-017)				26.5(E)	Pathogens	Agriculture/Package Plants/Urban Runoff/Storm Sewers
Hinkston Creek	(KY5100102-024)				19.8(E)	Pathogens	Municipal/Package Plants/Agriculture

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
		Uses Not Supported					
Kentucky River Basin							
North Fork Kentucky River	(KY5100201-010) (KY5100201-012) (KY5100201-017) (KY5100201-022)	108.2(E)	Siltation	Mining	86.4(M)	Pathogens	Municipal/Package Plants/Septic Tanks
Cane Creek	(KY5100201-006)				9.5(M)	Pathogens	Agriculture/Septic Tanks
Spring Fork Quicksand Creek	(KY5100201-007)	15.0(E)	Siltation	Mining			
Lost Creek	(KY5100201-009)	18.5(E)	Siltation	Mining			
Troublesome Creek	(KY5100201-009)				49.5(M)	Pathogens	Package Plants/ Municipal/Septic Tanks/Urban Runoff/Storm Sewers
Grapevine Creek	(KY5100201-011)	8.5(E)	Siltation	Mining			
Big Creek	(KY5100201-011)	9.6(E)	Siltation	Mining			
Carr Fork	(KY5100201-014)				8.7(M)	Pathogens	Septic Tanks

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Kentucky River Basin (Continued)							
Leatherwood Creek	(KY5100201-018)	13.9(E)	Siltation/pH/ Metals/Suspended Solids	Mining	13.9(E)	pH	Mining
Little Leatherwood Ck	(KY5100201-018)	6.6(E)	Siltation/pH/ Metals/Suspended Solids	Mining	6.6(E)	pH	Mining
Turkey Creek	(KY5100201-019)	6.4(E)	Siltation	Mining			
Maces Creek	(KY5100201-020)	6.8(E)	Siltation	Mining			
Bull Creek	(KY5100201-020)	5.3(E)	Siltation	Mining			
Stratton Fork	(KY5100201-020)	7.0(E)	Siltation	Mining			
Rockhouse Creek	(KY5100201-021)	24.3(E)	Siltation	Mining			
Kings Creek	(KY5100201-022)	6.5(E)	Siltation	Mining			
Smoot Creek	(KY5100201-022)	7.4(E)	Siltation	Mining			
Boone Fork	(KY5100201-022)	3.3(E)	Siltation	Mining			
Yonts Creek	(KY5100201-022)	3.4(E)	Siltation	Mining			
Wright Fork	(KY5100201-022)	4.7(E)	Siltation	Mining			
Middle Fork Kentucky River	(KY5100202-004) (KY5100202-007)	27.1(E)	Siltation	Mining			

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Kentucky River Basin (Continued)							
Cutshin Creek	(KY5100202-006)	28.8(E)	Oil and Grease/ Siltation	Petroleum Activities/Mining			
Raccoon Creek	(KY5100202-006)	7.3(E)	Oil and Grease/ Siltation	Petroleum Activities/Mining			
Billey Fork	(KY5100204-009)	8.1(M)	Chlorides	Petroleum Activities			
Millers Creek	(KY5100204-009)	6.4(M)	Chlorides/Siltation	Petroleum Activities/ Silviculture			
Big Sinking Creek	(KY5100204-009)	14.1(M)	Chlorides	Petroleum Activities			
Bald Rock Fork	(KY5100204-009)	1.7(E)	Chlorides	Petroleum Activities			
Right Fork Zachariah	(KY5100204-009)	1.3(E)	Chlorides	Petroleum Activities			
Left Fork Zachariah	(KY5100204-009)	1.3(E)	Chlorides	Petroleum Activities			
Red River	(KY5100204-013)				31.6(M)	Pathogens	Municipal/Septic Tanks/Urban Runoff/Storm Sewers/Agriculture
Cat Creek	(KY5100204-017)	7.7(M)	Organic Enrichment/ Metals	Source Unknown			
South Fork Red River	(KY5100204-018)	10.1(M)	Chlorides	Petroleum Activities			

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Kentucky River Basin (Continued)							
Sand Lick Creek	(KY5100204-018)	5.0 (M)	Chlorides	Petroleum Activities			
Eagle Creek	(KY5100205-003) (KY5100205-005)				38.8(M)	Pathogens	Agriculture
Elkhorn Creek	(KY5100205-018)				17.8(M)	Pathogens	Source Unknown
Dry Run	(KY5100205-023)				7.5(E)	Pathogens	Agriculture/Urban Runoff/Storm Sewers
U.T. to North Elkhorn Creek	(KY5100205-025)				10.8(E)	Pathogens	Agriculture
South Elkhorn Creek	(KY5100205-026)				17.6(M)	Pathogens	Urban Runoff/ Storm Sewers/ Agriculture
Lee Branch	(KY5100205-027)	1.0(E)	Organic Enrichment	Municipal			
Town Branch of S. Elkhorn Creek	(KY5100205-028)	11.3(M)	Organic Enrichment/ Nutrients	Municipal/Urban Runoff/Storm Sewers			
Clarks Run	(KY5100205-039)	8.0(E)	pH/Organic Enrichment	Municipal/Urban Runoff/Storm Sewers	8.0(E)	pH	Municipal/Urban Runoff/Storm Sewers

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
		Uses Not Supported					
Kentucky River Basin (Continued)							
Kentucky River	(KY5100205-047)				32.7(M)	Pathogens	Package Plants
Baughman Fork	(KY5100205-054)	1.1(M)	Organic Enrichment/ Nutrients	Package Plants			
Green River Basin							
Valley Creek	(KY5110001-012)	17.5(M)	Organic Enrichment/ Chlorine	Municipal/ Urban Runoff/ Storm Sewers			
Green River	(KY5110001-018)				66.7(M)	Pathogens	Pasture Land/Feed Lots/Animal Holding/Mgt. Areas
Patoka Creek	(KY5110002-018)				4.3(E)	Pathogens	Pasture Land/ Feedlots/ Animal Holding/ Mgt. Areas
Lewis Creek	(KY5110003-002)	14.9(E)	pH	Acid Mine Drainage	14.9(E)	pH	Acid Mine Drainage
Pond Creek	(KY5110003-003)	23.8(E)	pH/Metals	Mining	23.8(E)	pH/Metals	Mining
Bat East Creek	(KY5110003-003)	7.3(E)	pH/Metals	Acid Mine Drainage	7.3(E)	pH	Acid Mine Drainage
Caney Fork	(KY5110003-003)	7.1(E)	pH/Metals	Acid Mine Drainage	7.1(E)	pH	Acid Mine Drainage
Sandlick Creek	(KY5110003-003)	4.0(E)	pH/Metals	Acid Mine Drainage	4.0(E)	pH	Acid Mine Drainage

List of Streams Not Supporting Uses by River Basin (Continued)

Uses Not Supported

Stream (Waterbody I.D.)		Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Green River Basin (Continued)							
Mud River	(KY5110003-005) (KY5110003-008)	64.8(M)	Priority Organics/ Organic Enrichment	Industrial/ Unknown			
Green River	(KY5110005-001) (KY5110005-003) (KY5110005-011)				55.1(M)	Pathogens	Agriculture/ Urban Runoff/ Storm Sewers
North Fk. Panther Creek	(KY5110005-009)	12.7(E)	Flow Alteration/ Habitat Alteration	Channelization			
South Fk. Panther Creek	(KY5110005-010)	9.9(E)	Flow Alteration/ Habitat Alteration	Channelization			
Buck Creek	(KY5110005-016)	11.0(E)	Ammonia/pH/ Organic Enrichment	Industrial/Mining/ Animal Holding/ Mgt. Areas	11.0(E)	pH	Mining
West Fk. Buck Creek	(KY5110005-016)	3.9(E)	Ammonia/pH/ Organic Enrichment	Industrial/Mining Animal Holding/ Mgt. Areas	3.9(E)	pH	Mining
Cypress Creek	(KY5110006-002)	8.3(E)	pH	Mining	8.3(E)	pH	Mining
Harris Branch	(KY5110006-002)	2.6(E)	pH	Mining	2.6(E)	pH	Mining
Flat Creek	(KY5110006-005)	10.6(E)	pH	Mining	10.6(E)	pH	Mining
UT to Flat Creek	(KY5110006-005)	5.0(E)	pH	Mining	5.0(E)	pH	Mining

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
<u>Green River Basin (Continued)</u>							
Drakes Creek	(KY5110006-006)	8.5(E)	pH	Mining	21.3(E)	pH	Mining
<u>Upper Cumberland River Basin</u>							
Buck Creek	(KY5130101-016)	0.2(M)	Siltation/Flow Alteration/ Habitat Alteration	Mining			
Cumberland River	(KY5130101-025) (KY5130101-032)				16.2(M)	Pathogens	Municipal/Package Plants/Septic Tanks
Straight Creek	(KY5130101-030)				24.4(M)	Pathogens	Septic Tanks/Unknown
Left Fork Straight Creek	(KY5130101-030)	0.2(M)	Siltation/Flow Alteration/Mining/ Habitat Alteration		13.0(M)	Pathogens	Septic Tanks/Unknown
Poor Fork	(KY5130101-036)				49.7(M)	Pathogens	Municipal/Package Plants/Septic Tanks
Cloverlick Creek	(KY5130101-036)				8.1(M)	Pathogens	Septic Tanks
Looney Creek	(KY5130101-036)				8.9(M)	Pathogens	Municipal/Septic Tanks/Package Plants
Clover Fork	(KY5130101-037)				34.5(M)	Pathogens	Municipal/Septic Tanks/Package Plants

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
		Uses Not Supported					
<u>Upper Cumberland River Basin (Continued)</u>							
Catron Creek	(KY5130101-038)				8.5(M)	Pathogens	Septic Tanks/ Unknown
Martins Fork	(KY5130101-038)	8.0(E)	pH	Mining	4.4(M) 8.0(E)	Pathogens pH	Septic Tanks Mining
Cranks Creek	(KY5130101-038)	15.1(M)	Siltation/pH	Mining	15.1(M)	pH	Mining
Big Lily Creek	(KY5130103-011)	2.6(M)	Chlorides/ Organic Enrichment	Municipal/Urban Runoff/Storm Sewers			
Elk Spring Creek	(KY5130103-018)	1.5(E)	Organic Enrichment	Municipal			
Rock Creek	(KY5130104-007)	4.0(M)	Metals/pH	Mining	4.0(M)	pH	Mining
Roaring Paunch Creek	(KY5130104-008)	15.6(M)	pH	Subsurface Mining/Surface Mining	15.6(M)	pH	Mining
Bear Creek	(KY5130104-009)	3.2(M)	pH	Subsurface Mining/Surface Mining	3.2(M)	pH	Surface Mining/ Subsurface Mining

List of Streams Not Supporting Uses by River Basin (Continued)

		Uses Not Supported					
Stream (Waterbody I.D.)		Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Lower Cumberland River Basin							
North Fork Little River	(KY5130205-009)				14.0(E)	Pathogens	Urban Runoff/Storm Sewers/Agriculture
Elk Fork	(KY5130206-002)	7.0(E)	Organic Enrichment	Municipal/ Agriculture			
Salt River Basin							
Pond Creek	(KY5140102-002)	17.0(M)	Organic Enrichment/ Metals	Package Plants/ Urban Runoff/ Storm Sewers/ Unknown	17.0(M)	Pathogens	Package Plants/ Septic Tanks/Urban Runoff/Storm Sewers
Northern Ditch Pond Creek (inc. Fern Creek)	(KY5140102-002)	10.1(M)	Organic Enrichment/ Metals	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks	10.1(M)	Pathogens	Package Plants/ Urban Runoff/Storm Sewers/Septic Tanks
Southern Ditch Pond Creek	(KY5140102-002)	7.1(M)	Organic Enrichment/ Metals	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks	7.1(M)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported: Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Salt River Basin (Continued)							
Spring Ditch Pond Creek	(KY5140102-002)	2.0(M)	Organic Enrichment/ Metals	Package Plants/ Urban Runoff/ Storm Sewers	2.0(M)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers
Fishpool Creek	(KY5140102-002)	5.4(M)	Organic Enrichment/ Metals	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks	5.4(M)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks
Knob Creek	(KY5140102-002)	15.3(E)	Organic Enrichment/ Metals	Urban Runoff/ Storm Sewers/ Package Plants/ Septic Tanks			
Briar Creek	(KY5140102-002)	5.7(E)	Organic Enrichment/ Metals	Urban Runoff/ Storm Sewers/ Package Plants/ Septic Tanks			
Mill Creek	(KY5140102-003)				13.5(E)	Pathogens	Municipal

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
<u>Salt River Basin (Continued)</u>							
Salt River	(KY5140102-005) (KY5140102-031) (KY5140102-033)				47.0(M)	Pathogens	Agriculture/ Septic Tanks/ Urban Runoff/ Storm Sewers/ Package Plants
Floyds Fork	(KY5140102-007) (KY5140102-011) (KY5140102-014)	13.0(E)	Organic Enrichment Metals	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks	23.8(M) 13.8(E)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks/ Agriculture
Pennsylvania Run	(KY5140102-008)				3.0(M)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks
Brooks Run	(KY5140102-009)	6.0(E)	Organic Enrichment	Package Plants/ Urban Runoff/ Storm Sewers	6.0(E)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers
Chenoweth Run	(KY5140102-010)	9.1(M)	Organic Enrichment/ Metals/ Nutrients	Domestic/ Urban Runoff/ Storm Sewers/	9.1(M)	Pathogens	Urban Runoff/ Storm Sewers/ Package Plants/

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported: Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
<u>Salt River Basin (Continued)</u>							
Pope Lick Creek	(KY5140102-012)	5.0(M)	Organic Enrichment/ Unknown Toxicity	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks	5.0(M)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks
Long Run	(KY5140102-012)				9.5(M)	Pathogens	Agriculture/ Septic Tanks
Beech Creek	(KY5140102-026)				30.1(M)	Pathogens	Pasture Lands/ Feedlots/ Manure Lagoons/ Animal Holding/ Mgt. Areas/ Septic Tanks
Crooked Creek	(KY5140102-027)				13.9(M)	Pathogens	Unknown
Ashes Creek	(KY5140102-028)				10.3(M)	Pathogens	Pasture Land/ Feedlots/ Animal Holding/ Mgt. Areas

List of Streams Not Supporting Uses by River Basin (Continued)

Uses Not Supported

Stream (Waterbody I.D.)		Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Salt River Basin (Continued)							
Jacks Creek	(KY5140102-028)						
					8.0(M)	Pathogens	Pasture Land/ Feedlots/ Manure Lagoons/ Animals Holding/ Mgt. Areas
Timber Creek	(KY5140102-028)				4.8(M)	Pathogens	Pasture Land/ Feedlots/ Manure Lagoons/ Animals Holding/ Mgt. Areas
Town Creek	(KY5140102-033)				3.2(M)	Pathogens	Pasture Lands/ Feedlots/Animal Holding/Mgt. Areas
Rolling Fork	(KY5140103-001) (KY5140103-005)				108.0(M)	Pathogens	Municipal/ Agriculture/Urban Runoff/Storm/ Sewers
Beech Fork	(KY5140103-012)				10.2(M)	Pathogens	Agriculture

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Tradewater River Basin							
Crab Orchard Creek	(KY5140205-003)	22.6(E)	pH/Siltation	Mining/ Agriculture	22.6(E)	pH	Mining
Vaughn Ditch	(KY5140205-003)	3.2(E)	pH/Siltation	Mining/ Agriculture	3.2(E)	pH	Mining
Clear Creek	(KY5140205-008)	28.1(E)	pH/Siltation	Mining/ Agriculture	28.1(E)	pH	Mining
Lick Creek	(KY5140205-008)	18.1(E)	pH/Siltation	Mining/ Agriculture	18.1(E)	pH	Mining
Caney Creek	(KY5140205-015)	11.3(E)	pH/Siltation	Mining/ Agriculture	11.3(E)	pH	Mining
Buffalo Creek	(KY5140205-016)	7.8(E)	pH/Siltation	Mining/ Agriculture	7.8(E)	pH	Mining
Tennessee River Basin							
Cypress Creek	(KY6040006-013)	19.4(E)	Unknown Toxicity/ Priority Organics	Industrial			
Ohio River Tributaries							
Elijah's Creek	(KY5090203-004)	5.2(M)	Nonpriority Organics	Industrial			
Big Run	(KY5140101-001)	5.3(E)	Organic Enrichment	Urban Runoff/ Storm Sewers			

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Ohio River Tributaries (Continued)							
UT to Mill Creek	(KY5140101-001)	2.5(E)	Organic Enrichment	Urban Runoff/ Storm Sewers			
Mill Creek	(KY5140101-001)	16.5(M)	Metals	Urban Runoff/ Storm Sewers/ Septic Tanks	16.5(M)	Pathogens	Urban Runoff/ Package Plants/ Storm Sewers/ Septic Tanks
Beargrass Creek	(KY5140101-002)	1.6(E)	Organic Enrichment/Metals	Urban Runoff/ Storm Sewers/ Combined Sewer Overflows/ Package Plants/ Septic Tanks			
Muddy Fork Beargrass Creek	(KY5140101-002)	6.9(M)	Organic Enrichment/Metals	Urban Runoff/ Storm Sewers/ Package Plants/ Septic Tanks			
South Fork Beargrass Creek	(KY5140101-002)	14.6(M)	Organic Enrichment/Metals	Urban Runoff/ Storm Sewers/ Combined Sewer Overflows	6.0(M)	Pathogens	Combined Sewer Overflows/Urban Runoff/Storm Sewers

List of Streams Not Supporting Uses by River Basin (Continued)

Stream (Waterbody I.D.)		Uses Not Supported: Aquatic Life (miles)	Cause	Source	Swimming (miles)	Cause	Source
Ohio River Tributaries (Continued)							
Middle Fork Beargrass Creek	(KY5140101-002)	15.2(M)	Organic Enrichment/Metals	Urban Runoff/ Storm Sewers/ Package Plants/ Septic Tanks/ Combined Sewer Overflows	15.2(M)	Pathogens	Package Plants Septic Tanks/ Urban Runoff/ Storm Sewers/ Combined Sewer Overflows
Goose Creek	(KY5140101-003)	4.5(M)	Organic Enrichment/Metals	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks	7.2(M)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks
Little Goose Creek	(KY5140101-003)				8.7(M)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks
Harrods Creek	(KY5140101-004)	4.0(M)	Organic Enrichment/Metals	Package Plants/ Urban Runoff/ Storm Sewers Septic Tanks	4.0(M)	Pathogens	Package Plants/ Urban Runoff/ Storm Sewers/ Septic Tanks
Little Bayou Creek	(KY5140206-002)	6.5(M)	Priority Organics	Hazardous Waste			

*E = evaluated
**M = monitored

APPENDIX D
USE SUPPORT IN OHIO RIVER WATERBODIES

Ohio River - Warm Water Aquatic Life Use Support Assessment

Waterbody ID	States	From - To River Miles	Total Miles	Fully Supporting	Partially Supporting	Not Supporting	Causes	Potential Sources
OVWB 01	PA	0.0 - 6.2	6.2		6.2		Cu, Mlwb	Mining, Ind Point, Mun Point, Urban Runoff
OVWB 02	PA	6.2 - 13.3	7.1		7.1		Cu, Mlwb	Mining, Ind Point, Mun Point, Urban Runoff
OVWB 03	PA	13.3 - 25.4	12.1		12.1		Cu, Mlwb	Mining, Ind Point, Mun Point, Urban Runoff
OVWB 04	PA	25.4 - 31.7	6.3		6.3		Cu	Mining, Ind Point, Mun Point, Urban Runoff
OVWB 05	PA	31.7 - 40.2	8.5		8.5		Cu	Mining, Ind Point, Mun Point, Urban Runoff
OVWB 06	OH - WV	40.2 - 54.4	14.2	14.2				
OVWB 07	OH - WV	54.4 - 84.2	29.8	29.8				
OVWB 08	OH - WV	84.2 - 126.4	42.2	42.2				
OVWB 09	OH - WV	126.4 - 161.7	35.3		35.3		Cu	Mining, Ind Point, Mun Point, Urban Runoff
OVWB 10	OH - WV	161.7 - 172.2	10.5		10.5		Cu	Mining, Ind Point, Mun Point, Urban Runoff
OVWB 11	OH - WV	172.2 - 203.9	31.7	31.7				
OVWB 12	OH - WV	203.9 - 237.5	33.6	33.6				
OVWB 13	OH - WV	237.5 - 265.7	28.2	28.2				
OVWB 14	OH - WV	265.7 - 279.2	13.5		13.5		Pb, Cu, Mlwb	Ind Point, Mun Point, Urban Runoff
OVWB 15	OH - WV	279.2 - 317.1	37.9		37.9		Pb, Cu, Mlwb	Ind Point, Mun Point, Urban Runoff
OVWB 16	KY - OH	317.1 - 341.0	23.9		23.9		Pb, Mlwb	Ind Point, Mun Point, Urban Runoff
OVWB 17	KY - OH	341.0 - 356.5	15.5		15.5		Pb	Ind Point, Mun Point, Urban Runoff
OVWB 18	KY - OH	356.5 - 436.2	79.7	79.7				
OVWB 19	KY - OH	436.2 - 464.1	27.9	27.9				
OVWB 20	KY - OH	464.1 - 470.2	6.1	6.1				
OVWB 21	KY - OH	470.2 - 491.1	20.9		20.9		Zn, Mlwb	Unknown Nonpoint Source
OVWB 22	KY - IN	491.1 - 531.5	40.4		40.4		Zn	Unknown Nonpoint Source
OVWB 23	KY - IN	531.5 - 545.8	14.3	14.3				
OVWB 24	KY - IN	545.8 - 606.8	61.0		61.0		Zn	Unknown Nonpoint Source
OVWB 25	KY - IN	606.8 - 629.9	23.1	23.1				
OVWB 26	KY - IN	629.9 - 720.7	90.8		90.8		Cu	Unknown Nonpoint Source
OVWB 27	KY - IN	720.7 - 776.1	55.4		55.4		Cu	Unknown Nonpoint Source
OVWB 28	KY - IN	776.1 - 784.2	8.1		8.1		Cu	Unknown Nonpoint Source
OVWB 29	KY - IN	784.2 - 846.0	61.8		61.8		Cu	Unknown Nonpoint Source
OVWB 30	KY - IN	846.0 - 848.0	2.0		2.0		Cu	Unknown Nonpoint Source
OVWB 31	KY - IL	848.0 - 918.5	70.5		70.5		Cu, Pb, Zn	Unknown Nonpoint Source
OVWB 32	KY - IL	918.5 - 920.4	1.9		1.9		Pb, Zn	Unknown
OVWB 33	KY - IL	920.4 - 934.5	14.1		14.1		Pb	Unknown
OVWB 34	KY - IL	934.5 - 981.0	46.5	46.5				

Ind Point - industrial point source   Mun Point - municipal point source

Source: Table 10, ORSANCO, 1994

Ohio River -Contact Recreational Use Support Assessment Summary

Waterbody ID	States	From - To River Miles	Total Miles	Fully Supporting	Partially Supporting	Not Supporting	Causes	Potential Sources
OVWB 01	PA	0.0 - 6.2	6.2			6.2	Pathogen	CSO, Urban Runoff
OVWB 02	PA	6.2 - 13.3	7.1			7.1	Pathogen	CSO, Urban Runoff
OVWB 03	PA	13.3 - 25.4	12.1			12.1	Pathogen	CSO, Urban Runoff
OVWB 04	PA	25.4 - 31.7	6.3		6.3		Pathogen	CSO, Urban Runoff
OVWB 05	PA	31.7 - 40.2	8.5		8.5		Pathogen	CSO, Urban Runoff
OVWB 06	OH - WV	40.2 - 54.4	14.2		14.2		Pathogen	CSO, Urban Runoff
OVWB 07	OH - WV	54.4 - 84.2	29.8		29.8		Pathogen	CSO, Urban Runoff
OVWB 08	OH - WV	84.2 - 126.4	42.2		42.2		Pathogen	CSO, Urban Runoff
OVWB 09	OH - WV	126.4 - 161.7	35.3		35.3		Pathogen	CSO, Urban Runoff
OVWB 10	OH - WV	161.7 - 172.2	10.5		10.5		Pathogen	CSO, Urban Runoff
OVWB 11	OH - WV	172.2 - 203.9	31.7		31.7		Pathogen	CSO, Urban Runoff
OVWB 12	OH - WV	203.9 - 237.5	33.6		33.6		Pathogen	CSO, Urban Runoff
OVWB 13	OH - WV	237.5 - 265.7	28.2		28.2		Pathogen	CSO, Urban Runoff
OVWB 14	OH - WV	265.7 - 279.2	13.5		13.5		Pathogen	CSO, Urban Runoff
OVWB 15	OH - WV	279.2 - 317.1	37.9		32.7	5.2	Pathogen	CSO, Urban Runoff
OVWB 16	KY - OH	317.1 - 341.0	23.9			23.9	Pathogen	CSO, Urban Runoff
OVWB 17	KY - OH	341.0 - 356.5	15.5		15.5		Pathogen	CSO, Urban Runoff
OVWB 18	KY - OH	356.5 - 436.2	79.7		79.7		Pathogen	CSO, Urban Runoff
OVWB 19	KY - OH	436.2 - 464.1	27.9		27.9		Pathogen	CSO, Urban Runoff
OVWB 20	KY - OH	464.1 - 470.2	6.1			6.1	Pathogen	CSO, Urban Runoff
OVWB 21	KY - OH	470.2 - 491.1	20.9			20.9	Pathogen	CSO, Urban Runoff
OVWB 22	KY - IN	491.1 - 531.5	40.4		40.4		Pathogen	CSO, Urban Runoff
OVWB 23	KY - IN	531.5 - 545.8	14.3		14.3		Pathogen	CSO, Urban Runoff
OVWB 24	KY - IN	545.8 - 606.8	61.0		61.0		Pathogen	CSO, Urban Runoff
OVWB 25	KY - IN	606.8 - 629.9	23.1			23.1	Pathogen	CSO, Urban Runoff
OVWB 26	KY - IN	629.9 - 720.7	90.8		90.8		Pathogen	CSO, Urban Runoff
OVWB 27	KY - IN	720.7 - 776.1	55.4		55.4		Pathogen	CSO, Urban Runoff
OVWB 28	KY - IN	776.1 - 784.2	8.1			8.1	Pathogen	CSO, Urban Runoff
OVWB 29	KY - IN	784.2 - 846.0	61.8		46.0	15.8	Pathogen	CSO, Urban Runoff
OVWB 30	KY - IN	846.0 - 848.0	2.0		2.0		Pathogen	CSO, Urban Runoff
OVWB 31	KY - IL	848.0 - 918.5	70.5		70.5		Pathogen	CSO, Urban Runoff
OVWB 32	KY - IL	918.5 - 920.4	1.9		1.9		Pathogen	CSO, Urban Runoff
OVWB 33	KY - IL	920.4 - 934.5	14.1			14.1	Pathogen	CSO, Urban Runoff
OVWB 34	KY - IL	934.5 - 981.0	46.5		31.0	15.5	Pathogen	CSO, Urban Runoff

Source: Table 12, ORSANCO, 1994

Ohio River - Public Water Supply Use Support Assessment Summary

Waterbody ID	States	From - To River Miles	Total Miles	Fully Supporting	Partially Supporting	Not Supporting	Causes	Potential Sources
OVWB 01	PA	0.0 - 6.2	6.2	6.2				
OVWB 02	PA	6.2 - 13.3	7.1	7.1				
OVWB 03	PA	13.3 - 25.4	12.1	12.1				
OVWB 04	PA	25.4 - 31.7	6.3	6.3				
OVWB 05	PA	31.7 - 40.2	8.5	8.5				
OVWB 06	OH - WV	40.2 - 54.4	14.2	14.2				
OVWB 07	OH - WV	54.4 - 84.2	29.8	29.8				
OVWB 08	OH - WV	84.2 - 126.4	42.2	42.2				
OVWB 09	OH - WV	126.4 - 161.7	35.3	35.3				
OVWB 10	OH - WV	161.7 - 172.2	10.5	10.5				
OVWB 11	OH - WV	172.2 - 203.9	31.7	31.7				
OVWB 12	OH - WV	203.9 - 237.5	33.6	33.6				
OVWB 13	OH - WV	237.5 - 265.7	28.2	28.2				
OVWB 14	OH - WV	265.7 - 279.2	13.5	13.5				
OVWB 15	OH - WV	279.2 - 317.1	37.9	37.9				
OVWB 16	KY - OH	317.1 - 341.0	23.9	23.9				
OVWB 17	KY - OH	341.0 - 356.5	15.5	15.5				
OVWB 18	KY - OH	356.5 - 436.2	79.7	79.7				
OVWB 19	KY - OH	436.2 - 464.1	27.9	27.9				
OVWB 20	KY - OH	464.1 - 470.2	6.1	6.1				
OVWB 21	KY - OH	470.2 - 491.1	20.9	20.9				
OVWB 22	KY - IN	491.1 - 531.5	40.4	40.4				
OVWB 23	KY - IN	531.5 - 545.8	14.3		14.3		Pesticides	Agricultural Runoff
OVWB 24	KY - IN	545.8 - 606.8	61.0		61.0		Pesticides	Agricultural Runoff
OVWB 25	KY - IN	606.8 - 629.9	23.1		23.1		Pesticides	Agricultural Runoff
OVWB 26	KY - IN	629.9 - 720.7	90.8		90.8		Pesticides	Agricultural Runoff
OVWB 27	KY - IN	720.7 - 776.1	55.4		55.4		Pesticides	Agricultural Runoff
OVWB 28	KY - IN	776.1 - 784.2	8.1		8.1		Pesticides	Agricultural Runoff
OVWB 29	KY - IN	784.2 - 846.0	61.8		61.8		Pesticides	Agricultural Runoff
OVWB 30	KY - IN	846.0 - 848.0	2.0		2.0		Pesticides	Agricultural Runoff
OVWB 31	KY - IL	848.0 - 918.5	70.5		70.5		Pesticides	Agricultural Runoff
OVWB 32	KY - IL	918.5 - 920.4	1.9		1.9		Pesticides	Agricultural Runoff
OVWB 33	KY - IL	920.4 - 934.5	14.1		14.1		Pesticides	Agricultural Runoff
OVWB 34	KY - IL	934.5 - 981.0	46.5		46.5		Pest/Pri Organic	Ag/Groundwater Load

Source: Table 14, ORSANCO, 1994

Ohio River - 1992 ORSANCO FISH TISSUE CONTAMINANTS PROGRAM PCB/CHLORDANE EXCEEDANCES

LOCATION	RIVER MILE	SPECIES	SIZE RANGE (INCHES)	PCB	CHLORDANE
Mon #2 L&D*	RM 12.3	Carp	16.5 - 19.0	■	■
Mon #2 L&D	RM 12.3	Carp	15.0 - 21.0	■	■
Mon #2 L&D	RM 12.3	Channel Cat	15.5 - 19.0	■	□
Mon #2 L&D	RM 12.3	SM Bass	13.0 - 15.0	□	□
Emsworth L&D	RM 6.2	Carp	19.5 - 22.0	■	■
Emsworth L&D	RM 6.2	Channel Cat	18.5 - 20.5	■	■
Emsworth L&D	RM 6.2	Channel Cat	18.5 - 20.5	■	■
Emsworth L&D	RM 6.2	Channel Cat	15.5 - 17.0	□	□
Emsworth L&D	RM 6.2	Sauger	14.5 - 17.5	□	□
Hayesville, PA	RM 10.7	Channel Cat	15.0 - 19.5	■	■
Hayesville, PA	RM 10.7	Carp	14.0 - 17.5	■	□
Montgomery L&D	RM 31.7	Carp	19.0 - 20.0	■	□
Montgomery L&D	RM 31.7	Channel Cat	19.5 - 21.5	■	■
Montgomery L&D	RM 31.7	Channel Cat	17.5 - 19.0	■	■
Montgomery L&D	RM 31.7	Channel Cat	16.0 - 17.5	■	□
Chester, WV	RM 44.1	Carp	15.5 - 21.5	□	□
Chester, WV	RM 44.1	SM Bass	13.0 - 15.0	□	□
Chester, WV	RM 44.1	Sauger	13.0 - 17.0	□	□
Pike Is. L&D	RM 84.2	Carp	19.0 - 21.0	■	■
Pike Is. L&D	RM 84.2	Channel Cat	12.5 - 15.5	□	□
Pike Is. L&D	RM 84.2	Channel Cat	16.5 - 18.5	■	■
Pike Is. L&D	RM 84.2	Channel Cat	21.5 - 24.5	■	■
Pike Is. L&D	RM 84.2	Hybrid Striper	13.0 - 18.0	□	□
Pike Is. L&D	RM 84.2	SM Bass	15.0 - 16.0	□	□
Hannibal L&D	RM 126.4	Flathead Cat	27.0 - 30.5	■	■
Hannibal L&D	RM 126.4	Flathead Cat	19.5 - 20.5	□	□
Willow Is. L&D	RM 161.7	Carp	19.5 - 23.0	■	■
Willow Is. L&D	RM 161.7	Channel Cat	15.5 - 16.5	■	■
Willow Is. L&D	RM 161.7	Channel Cat	20.0 - 21.5	■	■
Willow Is. L&D	RM 161.7	Channel Cat	23.5 - 25.0	■	□
Willow Is. L&D	RM 161.7	Hybrid Striper	18.0 - 25.0	□	□
Belpre, OH	RM 182.7	Channel Cat	20.0 - 21.0	■	■
Belpre, OH	RM 182.7	Channel Cat	18.0 - 21.5	■	□
Belpre, OH	RM 182.7	Carp	17.5 - 21.5	■	■

LOCATION	RIVER MILE	SPECIES	SIZE RANGE (INCHES)	PCB	CHLORDANE
Belleville L&D	RM 203.9	Flathead Cat	19.5 - 22.5	□	□
Racine L&D	RM 237.5	Carp	19.5 - 22.0	■	□
Racine L&D	RM 237.5	Channel Cat	15.5 - 19.5	■	□
Racine L&D	RM 237.5	Channel Cat	15.5 - 19.5	■	■
Racine L&D	RM 237.5	Channel Cat	21.5 - 23.5	■	■
Racine L&D	RM 237.5	Flathead Cat	28.0 - 36.0	■	■
Racine L&D	RM 237.5	Hybrid Striper	17.5 - 20.0	□	□
Cheshire, OH	RM 255.9	Carp	19.5 - 23.0	□	□
Gallipolis L&D	RM 279.2	Hybrid Striper	18.0 - 22.5	□	□
Greenup L&D	RM 341.0	Carp	22.0 - 23.5	□	□
Greenup L&D	RM 341.0	Channel Cat	17.5 - 18.5	□	□
Greenup L&D	RM 341.0	Channel Cat	22.0 - 27.0	■	■
Greenup L&D	RM 341.0	Channel Cat	24.0 - 27.0	■	■
Greenup L&D	RM 341.0	Channel Cat	17.0 - 18.0	□	□
Markland L&D	RM 531.5	Carp	22.0 - 24.5	□	□
Markland L&D	RM 531.5	Channel Cat	14.0 - 17.5	□	■
Markland L&D	RM 531.5	Channel Cat	20.0 - 21.5	■	■
Markland L&D	RM 531.5	Channel Cat	21.5 - 23.0	■	■
Bethlehem, IN	RM 569.7	Channel Cat	20.5 - 23.5	□	■
Cannelton L&D	RM 720.7	Carp	22.0 - 23.0	□	□
Cannelton L&D	RM 720.7	Channel Cat	17.0 - 18.5	□	□
Cannelton L&D	RM 720.7	Channel Cat	19.5 - 21.5	■	■
Cannelton L&D	RM 720.7	Channel Cat	22.5 - 25.0	□	□
Cannelton L&D	RM 720.7	Striped Bass	12.0 - 14.0	□	□
Rockport, IN	RM 746.9	Channel Cat	17.0 - 19.5	□	□
Rockport, IN	RM 746.9	Spotted Bass	11.5 - 15.5	□	□
Uniontown L&D	RM 846.0	Carp	21.5-23.5	□	□
Uniontown L&D	RM 846.0	Channel Cat	17.5 - 19.5	□	□
Uniontown L&D	RM 846.0	Channel Cat	21.5 - 22.0	□	□
Uniontown L&D	RM 846.0	Channel Cat	22.5 - 23.5	□	■
Uniontown L&D	RM 846.0	Striped Bass	14.0 - 14.5	□	□
Uniontown L&D	RM 846.0	Channel Cat	14.5 - 19.0	□	□
Uniontown L&D	RM 846.0	Sauger	12.5 - 14.5	□	□
Uniontown L&D	RM 846.0	Channel Cat	15.5 - 19.5	□	□
Cave-In-Rock, IL	RM 882.0	Carp	19.5 - 23.0	□	□
Cave-In-Rock, IL	RM 882.0	LM Bass	14.0 - 15.5	□	□
Cave-In-Rock, IL	RM 882.0	Channel Cat	14.5 - 22.0	□	□

L&D = Locks and Dam Location

□ = Does not exceed action level

■ = Does exceed action level

Source: Table 15, ORSANCO, 1994

APPENDIX E
SECTION 319-FUNDED NONPOINT SOURCE PROJECTS IN WATERSHEDS WITH ONGOING TMDL STUDIES

Section 319-Funded Nonpoint Source Projects in Kentucky

Project	Outputs	Project Cost/Schedule
Upper Salt River/Taylorsville Reservoir Project	Collect water quality data. Initiate Water Watch sampling. Total Maximum Daily Load (TMDL) implementation. Provide additional technical assistance to landowners. Assist with water quality monitoring. Hire project coordinator. Develop and print newsletter. Establish BMP tracking system.	$607,541 FFY91-FFY98
Upper North Fork of the Kentucky River On-Site Wastewater Management Project	On-site wastewater disposal alternatives. Public education program. Pre- and post-BMP monitoring. BMP implementation.	$330,000 FFY94-FFY96
Floyd's Fork Community Education Project--Louisville/Jefferson County Conservation District	Develop three video tape presentations for development community, residents of Floyd's Fork, and high school students.	$83,334 FFY92-FFY93
Harrods Creek Community Education Project-Jefferson County Conservation District	Brochure for small site homebuilders and developers. Brochure: "Homeowners Conservation and Watershed Management Guide." Brochure: "You and the Waters of Harrods Creek." Curriculum Guide. Field Demonstration.	$86,000 FFY94-FFY95